

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

Date: May 15, 2008

Applicants: Bednorz et al.

Docket: YO987-074BZ

Serial No.: 08/479,810

Group Art Unit: 1751

Filed: June 7, 1995

Examiner: M. Kopec

For: NEW SUPERCONDUCTIVE COMPOUNDS HAVING HIGH TRANSITION  
TEMPERATURE, METHODS FOR THEIR USE AND PREPARATION

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

**CORRECTED APPEAL BRIEF**

**Part VII**

**CFR 37 §41.37(c)(1)(vii)**

**VOLUME 3**

**Part 5**

**Argument For the Patentability of Each Rejected Claims 354-357**

Respectfully submitted,

/Daniel P Morris/

Dr. Daniel P. Morris, Esq.

Reg. No. 32,053

(914) 945-3217

IBM CORPORATION  
Intellectual Property Law Dept.  
P.O. Box 218  
Yorktown Heights, New York 10598

**CLAIM 354/165**

CLAIM 354/165 recites:

CLAIM 165 An apparatus for causing electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

(a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a layer-type perovskite-like crystal structure, the composition having a superconductive transition temperature Tc of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element; and a Group III B element;

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that

persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/166**

CLAIM 354/166 recites:

CLAIM 166 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound having a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature Tc and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature Tp=0, the transition-onset temperature Tc being greater than or equal to 26°K;
- (b) a temperature controller maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature Tp=0 of the superconductive composition; and
- (c) a current source causing an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/185**

CLAIM 354/185 recites:

CLAIM 185 An apparatus comprising a superconducting oxide composition having a superconductive onset temperature greater than or equal to 26°K, a temperature controller maintaining said superconducting copper oxide at a temperature less than said superconducting onset temperature and a current source flowing a superconducting current therein, said composition comprising at least one each of rare earth, an alkaline earth, and copper.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 185 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole

1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/220**

CLAIM 354/220 recites:

CLAIM 185 An apparatus comprising a superconducting oxide composition having a superconductive onset temperature greater than or equal to 26°K, a temperature controller maintaining said superconducting copper oxide at a temperature less than said superconducting onset temperature and a current source flowing a superconducting current therein, said composition comprising at least one each of rare earth, an alkaline earth, and copper.

CLAIM 220 An apparatus according to claim 185 wherein said superconducting oxide composition comprises a substantially layered perovskite crystal structure.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 220 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has

expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/240**

CLAIM 354/240 recites:

CLAIM 240 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/241**

CLAIM 354/241 recites:

CLAIM 240 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 241 An apparatus according to claim 240 in which the copper-oxide compound of the superconductive composition includes at least one rare-earth or rare-earth-like element and at least one alkaline-earth element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said

superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 241 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/242**

CLAIM 354/242 recites:

CLAIM 240 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

(a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition

comprising a superconductor transition temperature Tc of greater than or equal to 26°K;

(b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and

(c) a source of an electric current to flow in the superconductor element.

CLAIM 241 An apparatus according to claim 240 in which the copper-oxide compound of the superconductive composition includes at least one rare-earth or rare-earth-like element and at least one alkaline-earth element.

CLAIM 242 An apparatus according to claim 241 in which the rare-earth or rare-earth-like element is lanthanum.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

**This claim should be allowed since claim 242 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/243**

CLAIM 354/243 recites:

CLAIM 240 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 241 An apparatus according to claim 240 in which the copper-oxide compound of the superconductive composition includes at least one rare-earth or rare-earth-like element and at least one alkaline-earth element.

CLAIM 243 An apparatus according to claim 241 in which the alkaline-earth element is barium.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 243 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/244**

CLAIM 354/244 recites:

CLAIM 240 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 244 An apparatus according to claim 240 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said

superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/245**

CLAIM 354/245 recites:

CLAIM 240 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 244 An apparatus according to claim 240 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 245 An apparatus according to claim 244 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/246**

CLAIM 354/246 recites:

CLAIM 240 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 244 An apparatus according to claim 240 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 245 An apparatus according to claim 244 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 246 An apparatus according to claim 245 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentenced bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/247**

CLAIM 354/247 recites:

CLAIM 247 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one rare-earth or rare-earth-like element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

**This claim should be allowed since claim 247 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/248**

CLAIM 354/248 recites:

CLAIM 247 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one rare-earth or rare-earth-like element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 248 An apparatus according to claim 247 in which the rare-earth or rare-earth-like element is lanthanum.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 248 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentenced bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/249**

CLAIM 354/249 recites:

CLAIM 247 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one rare-earth or rare-earth-like element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 249 An apparatus according to claim 247 in which the alkaline-earth element is barium.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 249 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentenced bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/250**

CLAIM 354/250 recites:

CLAIM 247 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one rare-earth or rare-earth-like element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 250 An apparatus according to claim 247 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 250 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/251**

CLAIM 354/251 recites:

CLAIM 247 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one rare-earth or rare-earth-like element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 250 An apparatus according to claim 247 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 251 An apparatus according to claim 250 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claims should be allowed sincde claim 251 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in

view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/252**

CLAIM 354/252 recites:

CLAIM 247 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one rare-earth or rare-earth-like element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 250 An apparatus according to claim 247 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 251 An apparatus according to claim 250 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 252 An apparatus according to claim 251 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 252 is allowed.**

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement

Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## **CLAIM 354/261**

CLAIM 354/261 recites:

CLAIM 261 An apparatus capable of carrying an electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductive transition temperature Tc of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said

superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 261 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## **CLAIM 354/262**

CLAIM 354/262 recites:

CLAIM 262 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element, the composition comprising a superconductive/resistive transition defining a superconductive-resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

**This claim should be allowed since claim 262 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/289**

CLAIM 354/289 recites:

CLAIM 289 An apparatus for causing electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/290**

CLAIM 354/290 recites:

CLAIM 289 An apparatus for causing electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 290 An apparatus according to claim 289 in which the copper-oxide compound of the superconductive composition includes at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said

superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/291**

CLAIM 354/291 recites:

CLAIM 289 An apparatus for causing electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 290 An apparatus according to claim 289 in which the copper-oxide compound of the superconductive composition includes at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element.

CLAIM 291 An apparatus according to claim 290 in which  
the rare-earth or (SIC) element is lanthanum.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for

example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/292**

CLAIM 354/292 recites:

CLAIM 289 An apparatus for causing electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 290 An apparatus according to claim 289 in which the copper-oxide compound of the superconductive composition includes at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element.

CLAIM 292 An apparatus according to claim 290 in which the alkaline-earth element is barium.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/293**

CLAIM 354/293 recites:

CLAIM 289 An apparatus for causing electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 293 An apparatus according to claim 289 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said

superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/294**

CLAIM 354/294 recites:

CLAIM 289 An apparatus for causing electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 293 An apparatus according to claim 289 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 294 An apparatus according to claim 293 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/295**

CLAIM 354/295 recites:

CLAIM 289 An apparatus for causing electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 293 An apparatus according to claim 289 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 294 An apparatus according to claim 293 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 295 An apparatus according to claim 294 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/296**

CLAIM 354/296 recites:

CLAIM 296 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

**This claim should be allowed since claim 296 ia allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/297**

CLAIM 354/297 recites:

CLAIM 296 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 297 An apparatus according to claim 296 in which said at least one element is lanthanum.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 297 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## CLAIM 354/298

CLAIM 354/298 recites:

CLAIM 296 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 298 An apparatus according to claim 296 in which the alkaline-earth element is barium.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 298 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentenced bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/299**

CLAIM 354/299 recites:

CLAIM 296 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 299 An apparatus according to claim 296 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 299 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/300**

CLAIM 354/300 recites:

CLAIM 296 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 299 An apparatus according to claim 296 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 300 An apparatus according to claim 299 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 300 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in

view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/301**

CLAIM 354/301 recites:

CLAIM 296 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a substantially layered perovskite crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a rare-earth element and a Group III B element and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 299 An apparatus according to claim 296 in which the copper-oxide compound of the superconductive composition includes mixed valent copper ions.

CLAIM 300 An apparatus according to claim 299 in which the copper-oxide compound includes at least one element in a nonstoichiometric atomic proportion.

CLAIM 301 An apparatus according to claim 300 in which oxygen is present in the copper-oxide compound in a nonstoichiometric atomic proportion.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 301 is allowed.**

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement

Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/394**

CLAIM 354/394 recites:

CLAIM 394 An apparatus for causing electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the composition having a superconductive transition temperature Tc of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element; and a Group III B element;
- (b) a temperature controller maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a current source causing an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said

superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/395**

CLAIM 354/395 recites:

CLAIM 395 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, the composition having a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a current source causing an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/402**

CLAIM 354/402 recites:

CLAIM 402 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/403**

CLAIM 354/403 recites:

CLAIM 402 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 403 An apparatus according to claim 402 in which the copper-oxide compound of the superconductive composition includes at least one rare-earth or an element comprising a rare earth characteristic and at least one alkaline-earth element.

CLAIM 354 An apparatus according to anyone of claims  
165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289,  
290 to 301, 394, 395, 402-406, 409 or 410, wherein said  
superconductive composition can be made according to  
known principles of ceramic science.

**This claim should be allowed since claim 403 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/404**

CLAIM 354/404 recites:

CLAIM 402 An apparatus capable of carrying electric current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the composition comprising a superconductor transition temperature Tc of greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 403 An apparatus according to claim 402 in which the copper-oxide compound of the superconductive composition includes at least one rare-earth or an element comprising a rare earth characteristic and at least one alkaline-earth element.

CLAIM 404 An apparatus according to claim 403 in which the rare-earth or element comprising a rare earth characteristic is lanthanum.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 404 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/405**

CLAIM 354/405 recites:

CLAIM 405 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound comprising at least one rare-earth or element comprising a rare earth characteristic and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 405 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/406**

CLAIM 354/406 recites:

CLAIM 405 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound comprising at least one rare-earth or element comprising a rare earth characteristic and at least one alkaline-earth element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 406 An apparatus according to claim 405 in which the rare-earth or element comprising a rare earth characteristic is lanthanum.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed classicne claim 406 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/409**

CLAIM 354/409 recites:

CLAIM 409 An apparatus capable of carrying an electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the composition comprising a superconductive transition temperature  $T_c$  of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature  $T_c$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said

superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 409 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 354/410**

CLAIM 354/410 recites:

CLAIM 410 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element, the composition comprising a superconductive/resistive transition defining a superconductive-resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to  $26^{\circ}\text{K}$ ;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 354 An apparatus according to anyone of claims 165, 166, 185, 220, 240 to 246, 247 to 252, 261, 262, 289, 290 to 301, 394, 395, 402-406, 409 or 410, wherein said superconductive composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 410 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## CLAIM 355/77

CLAIM 355/77 recites:

CLAIM 77 A combination, comprising:

a mixed copper oxide composition including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE), said composition having a layer-like crystalline structure and multi-valent oxidation states, said composition exhibiting a substantially zero resistance to the flow of electrical current therethrough when cooled to a superconducting state at a temperature greater than or equal to 26°K, said mixed copper oxide having a superconducting onset temperature greater than or equal to 26°K, and

electrical means for passing an electrical superconducting current through said composition when said composition exhibits substantially zero resistance at a temperature greater than or equal to 26°K and less than said onset temperature.

CLAIM 355 A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 77 is allowed**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that

come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## CLAIM 355/78

CLAIM 355/78 recites:

CLAIM 77 A combination, comprising:

a mixed copper oxide composition including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE), said composition having a layer-like crystalline structure and multi-valent oxidation states, said composition exhibiting a substantially zero resistance to the flow of electrical current therethrough when cooled to a superconducting state at a temperature greater than or equal to 26°K, said mixed copper oxide having a superconducting onset temperature greater than or equal to 26°K, and

electrical means for passing an electrical superconducting current through said composition when said composition exhibits substantially zero resistance at a temperature greater than or equal to 26°K and less than said onset temperature.

CLAIM 78 The combination of claim 77, where the ratio (AE,RE) : Cu is substantially 1:1.

CLAIM 355 A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 78 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## **CLAIM 355/79**

CLAIM 355/79 recites:

CLAIM 77 A combination, comprising:

a mixed copper oxide composition including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE), said composition having a layer-like crystalline structure and multi-valent oxidation states, said composition exhibiting a substantially zero resistance to the flow of electrical current therethrough when cooled to a superconducting state at a temperature greater than or equal to 26°K, said mixed copper oxide having a superconducting onset temperature greater than or equal to 26°K, and

electrical means for passing an electrical superconducting current through said composition when said composition exhibits substantially zero resistance at a temperature greater than or equal to 26°K and less than said onset temperature.

CLAIM 79 The combination of claim 77, where the ratio (AE,RE) : Cu is substantially 1:1.

CLAIM 355 A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 79 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has

given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## CLAIM 355/80

CLAIM 355/80 recites:

CLAIM 77 A combination, comprising:

a mixed copper oxide composition including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE), said composition having a layer-like crystalline structure and multi-valent oxidation states, said composition exhibiting a substantially zero resistance to the flow of electrical current therethrough when cooled to a superconducting state at a temperature greater than or equal to 26°K, said mixed copper oxide having a superconducting onset temperature greater than or equal to 26°K, and

electrical means for passing an electrical superconducting current through said composition when said composition exhibits substantially zero resistance at a temperature greater than or equal to 26°K and less than said onset temperature.

CLAIM 80 The combination of claim 77, wherein said crystalline structure is perovskite-like.

CLAIM 355 A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 80 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has

given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 355/81**

CLAIM 355/81 recites:

**CLAIM 77** A combination, comprising:

a mixed copper oxide composition including an alkaline earth element (AE) and a rare earth or rare earth-like element (RE), said composition having a layer-like crystalline structure and multi-valent oxidation states, said composition exhibiting a substantially zero resistance to the flow of electrical current therethrough when cooled to a superconducting state at a temperature greater than or equal to 26°K, said mixed copper oxide having a superconducting onset temperature greater than or equal to 26°K, and

electrical means for passing an electrical superconducting current through said composition when said composition exhibits substantially zero resistance at a temperature greater than or equal to 26°K and less than said onset temperature.

**CLAIM 81** The combination of claim 77, where said mixed copper oxide composition has a non-stoichiometric amount of oxygen therein.

**CLAIM 355** A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 81 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 355/186**

CLAIM 355/186 recites:

CLAIM 186 An apparatus comprising a superconducting oxide composition having a superconductive onset temperature greater than or equal to 26°K, a temperature controller maintaining said superconducting copper oxide at a temperature less than said superconducting onset temperature and a current source flowing a superconducting electrical current therein, said composition comprising at least one each of a Group III B element, an alkaline earth, and copper.

CLAIM 355 A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 186 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole

1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 355/379**

CLAIM 355/379 recites:

CLAIM 379 A combination, comprising:

a mixed copper oxide composition including an alkaline earth element (AE) and a rare earth or element (RE) comprising a rare earth characteristic, said composition comprising a crystalline structure comprising a layered characteristic and multi-valent oxidation states, said composition exhibiting a substantially zero resistance to the flow of electrical current therethrough when cooled to a superconducting state at a temperature greater than or equal to 26°K, said mixed copper oxide having a superconducting onset temperature greater than or equal to 26°K, and

a current source for passing an electrical superconducting current through said composition when said composition exhibits substantially zero resistance at a temperature greater than or equal to 26°K and less than said onset temperature.

CLAIM 355 A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 379 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 355/380**

CLAIM 355/380 recites:

CLAIM 379 A combination, comprising:

a mixed copper oxide composition including an alkaline earth element (AE) and a rare earth or element (RE) comprising a rare earth characteristic, said composition comprising a crystalline structure comprising a layered characteristic and multi-valent oxidation states, said composition exhibiting a substantially zero resistance to the flow of electrical current therethrough when cooled to a superconducting state at a temperature greater than or equal to 26°K, said mixed copper oxide having a superconducting onset temperature greater than or equal to 26°K, and

a current source for passing an electrical superconducting current through said composition when said composition exhibits substantially zero resistance at a temperature greater than or equal to 26°K and less than said onset temperature.

CLAIM 380 The combination of claim 379, wherein said crystalline structure comprises a perovskite characteristic.

CLAIM 355 A combination according to anyone of claims 77 to 81, 186, 379 or 380, wherein said mixed copper oxide composition can be made according to known principles of ceramic science.

**This claim should be allowed since claim 380 is allowed,**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 356/124**

CLAIM 356/124 recites:

CLAIM 124 A device comprising a composition of matter having a Tc greater than or equal to 26°K carrying a superconducting current, said composition comprising at least one each of a IIIB element, an alkaline earth, and copper oxide said device is maintained at a temperature less than said Tc.

CLAIM 356 A device according to anyone of claims 124 to 127, wherein said composition of matter can be made according to known principles of ceramic science.

**This claim should bbe allowed since claim 124 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in

view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 356/125**

CLAIM 356/125 recites:

CLAIM 125 An apparatus comprising a composition of matter having a Tc greater than or equal to 26°K carrying a superconducting current, said composition comprising at least one each of a rare earth, an alkaline earth, and copper oxide.

CLAIM 356 A device according to anyone of claims 124 to 127, wherein said composition of matter can be made according to known principles of ceramic science.

**This claim should bbe allowed since claim 125 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in

view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## CLAIM 356/126

CLAIM 356/126 recites:

CLAIM 126 A device comprising a composition of matter having a Tc greater than or equal to 26°K carrying a superconducting current, said composition comprising at least one each of a rare earth, and copper oxide.

CLAIM 356 A device according to anyone of claims 124 to 127, wherein said composition of matter can be made according to known principles of ceramic science.

**This claim should bbe allowed since claim 126 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
“Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior.” Applicants discovered that ceramic materials are superconductors.

**CLAIM 356/127**

CLAIM 356/127 recites:

CLAIM 127 A device comprising a composition of matter having a Tc greater than or equal to 26°K carrying a superconducting current, said composition comprising at least one each of a IIIB element, and copper oxide.

CLAIM 356 A device according to anyone of claims 124 to 127, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/190**

CLAIM 357/190 recites:

CLAIM 190 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K, said composition comprising at least one each of a Group III B element, an alkaline earth, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 190 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement

Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/191**

CLAIM 357/191 recites:

CLAIM 191 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K, said composition comprising at least one each of a rare earth, alkaline earth, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than said Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 191 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement

Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/192**

CLAIM 357/192 recites:

CLAIM 192 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K, said composition comprising at least one each of a rare earth, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than said Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe,

Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/193**

CLAIM 357/193 recites:

CLAIM 193 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K carrying, said composition comprising at least one each of a Group III B element, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than said Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe,

Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/194**

CLAIM 357/194 recites:

CLAIM 194 An apparatus comprising a current source flowing a superconducting electrical current in a transition metal oxide comprising a Tc greater than or equal to 26°K and a temperature controller maintaining said transition metal oxide at a temperature less than said Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 190 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner

has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/225**

CLAIM 357/225 recites:

CLAIM 190 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K, said composition comprising at least one each of a Group III B element, an alkaline earth, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than Tc.

CLAIM 225 An apparatus according to claim 190 wherein said composition of matter comprises a substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 225 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that

persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/226**

CLAIM 357/226 recites:

CLAIM 191 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K, said composition comprising at least one each of a rare earth, alkaline earth, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than said Tc.

CLAIM 226 An apparatus according to claim 191 wherein said composition of matter comprises substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 226 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has

expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/227**

CLAIM 357/227 recites:

CLAIM 192 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K, said composition comprising at least one each of a rare earth, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than said Tc.

CLAIM 227 An apparatus according to claim 192 wherein said composition of matter comprises a substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that

persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/228**

CLAIM 357/228 recites:

CLAIM 193 An apparatus comprising a current source flowing a superconducting electrical current in a composition of matter having a Tc greater than or equal to 26°K carrying, said composition comprising at least one each of a Group III B element, and copper oxide and a temperature controller maintaining said composition of matter at a temperature less than said Tc.

CLAIM 228 An apparatus according to claim 193 wherein said composition of matter comprises substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim

without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/229**

CLAIM 357/229 recites:

CLAIM 194 An apparatus comprising a current source flowing a superconducting electrical current in a transition metal oxide comprising a Tc greater than or equal to 26°K and a temperature controller maintaining said transition metal oxide at a temperature less than said Tc.

CLAIM 229 An apparatus according to claim 194 wherein said transition (SIC) metal oxide comprises substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole

1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/231**

CLAIM 357/231 recites:

CLAIM 231 An apparatus comprising a composition of matter having a T<sub>c</sub> greater than or equal to 26°K carrying a superconducting current, said composition comprising at least one each of a rare earth, an alkaline earth, and copper oxide.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 231 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in

view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/256**

CLAIM 357/256 recites:

CLAIM 256 An apparatus capable of carrying an electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductive transition temperature Tc of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element; and a Group III B element;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/257**

CLAIM 357/257 recites:

CLAIM 257 An apparatus capable of carrying an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a Group II A element, a rare earth element and a Group III B element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/266**

CLAIM 357/266 recites:

CLAIM 266 An apparatus capable of carrying an electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductive transition temperature Tc of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said

composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 266 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## **CLAIM 357/267**

CLAIM 357/267 recites:

CLAIM 267 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal-oxide compound comprising a layer-type perovskite-like crystal structure, the transition metal-oxide compound including at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 267 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/271**

CLAIM 357/271 recites:

CLAIM 271 An apparatus for causing an electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the composition comprising a superconductive transition temperature Tc of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, at least one element selected from the group consisting of a rare earth element and at least one element selected from the group consisting of a Group III B element;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said

composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 271 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

## **CLAIM 357/272**

CLAIM 357/272 recites:

CLAIM 272 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a layer-type perovskite-like crystal structure, the copper-oxide compound including at least one element selected from the group consisting of a group II A element, at least one element selected from the group consisting of a rare earth element and at least one element selected from the group consisting of a Group III B element, the composition comprising a superconductive-resistive transition temperature defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and

(c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 272 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentenced bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/281**

CLAIM 357/281 recites:

CLAIM 281 An apparatus comprising a source of a superconducting electrical current in a composition of matter comprising a Tc greater than or equal to 26°K, said composition comprising at least one each of a III B element, an alkaline earth, and copper oxide and a temperature controller for maintaining said composition of matter at a temperature less than Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 281 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement

Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/282**

CLAIM 357/282 recites:

CLAIM 282 An apparatus comprising a source of a superconducting electrical current in a composition of matter comprising a T<sub>c</sub> greater than or equal to 26°K, said composition comprising at least one each of a rare earth, alkaline earth, and copper oxide and a temperature controller for maintaining said composition of matter at a temperature less than said T<sub>c</sub>.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 282 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement

Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/283**

CLAIM 357/283 recites:

CLAIM 283 An apparatus comprising a source of a superconducting electrical current in a composition of matter comprising a Tc greater than or equal to 26°K, said composition comprising at least one each of a rare earth, and copper oxide and a temperature controller for maintaining said composition of matter at a temperature less than said Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe,

Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/284**

CLAIM 357/284 recites:

CLAIM 284 An apparatus comprising a source of a superconducting electrical current in a composition of matter comprising a Tc greater than or equal to 26°K carrying, said composition comprising at least one each of a III B element, and copper oxide and a temperature controller for maintaining said composition of matter at a temperature less than said Tc.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe,

Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states

"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/317**

CLAIM 357/317 recites:

CLAIM 282 An apparatus comprising a source of a superconducting electrical current in a composition of matter comprising a T<sub>c</sub> greater than or equal to 26°K, said composition comprising at least one each of a rare earth, alkaline earth, and copper oxide and a temperature controller for maintaining said composition of matter at a temperature less than said T<sub>c</sub>.

CLAIM 317 An apparatus according to claim 282 wherein said composition of matter comprises substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claims should be allowed since claim 317 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that

persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/318**

CLAIM 357/318 recites:

CLAIM 283 An apparatus comprising a source of a superconducting electrical current in a composition of matter comprising a Tc greater than or equal to 26°K, said composition comprising at least one each of a rare earth, and copper oxide and a temperature controller for maintaining said composition of matter at a temperature less than said Tc.

CLAIM 318 An apparatus according to claim 283 wherein said composition of matter comprises a substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim

without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/319**

CLAIM 357/319 recites:

CLAIM 284 An apparatus comprising a source of a superconducting electrical current in a composition of matter comprising a Tc greater than or equal to 26°K carrying, said composition comprising at least one each of a III B element, and copper oxide and a temperature controller for maintaining said composition of matter at a temperature less than said Tc.

CLAIM 319 An apparatus according to claim 284 wherein said composition of matter comprises substantially layered perovskite crystal structure.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that

persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states  
"Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/407**

CLAIM 357/407 recites:

CLAIM 407 An apparatus capable of carrying an electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the composition comprising a superconductive transition temperature Tc of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element, a rare earth element; and a Group III B element;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition temperature Tc of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said

composition of matter can be made according to known principles of ceramic science.

The Examiner has not made as to this claim a *prima facie* case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/411**

CLAIM 357/411 recites:

CLAIM 411 An apparatus capable of carrying an electric-current flow in a superconductive state at a temperature greater than or equal to 26°K, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the composition comprising a superconductive transition temperature  $T_c$  of greater than or equal to 26°K, said superconductive composition includes at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element;
- (b) a temperature controller for maintaining the superconductor element at a temperature greater than or equal to 26°K and below the superconductor transition  $T_c$  of the superconductive composition; and
- (c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said

composition of matter can be made according to known principles of ceramic science.

**This claim should be allowed since claim 411 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/412**

CLAIM 357/412 recites:

CLAIM 412 An apparatus for conducting an electric current essentially without resistive losses, comprising:

(a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a transition metal-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the transition metal-oxide compound including at least one element selected from the group consisting of a Group II A element and at least one element selected from the group consisting of a rare earth element and a Group III B element, the composition comprising a superconductive/resistive transition defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;

(b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and

(c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claim should be allowed since claim 412 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentence bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure

converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.

**CLAIM 357/413**

CLAIM 357/413 recites:

CLAIM 413 An apparatus for conducting an electric current essentially without resistive losses, comprising:

- (a) a superconductor element made of a superconductive composition, the superconductive composition consisting essentially of a copper-oxide compound comprising a crystal structure comprising a layered characteristic and a perovskite characteristic, the copper-oxide compound including at least one element selected from the group consisting of a group II A element, at least one element selected from the group consisting of a rare earth element and at least one element selected from the group consisting of a Group III B element, the composition comprising a superconductive-resistive transition temperature defining a superconductive/resistive-transition temperature range between an upper limit defined by a transition-onset temperature  $T_c$  and a lower limit defined by an effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ , the transition-onset temperature  $T_c$  being greater than or equal to 26°K;
- (b) a temperature controller for maintaining the superconductor element at a temperature below the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$  of the superconductive composition; and

(c) a source of an electric current to flow in the superconductor element.

CLAIM 357 An apparatus according to anyone of claims 190 to 194, 225 to 229, 231, 256, 257, 266, 267, 271, 272, 281 to 284, 317 to 319, 407, or 411 to 413, wherein said composition of matter can be made according to known principles of ceramic science.

**This claim should be allowed since claim 413 is allowed.**

The Examiner has not made as to this claim a prima facie case of lack of enablement for the reasons given in all volumes of this Brief. The Examiner has given no specific reasons for rejecting this claim as not enabled. The Examiner has not shown why a person of ordinary skill in the art cannot, based on Applicants' teaching, determine without undue experimentation, species that come within the scope of this claim other than those that the Examiner has expressly stated are enabled. Applicants have shown extensive evidence that persons of skill in the art can determine species within the scope of this claim without undue experimentation. Examples of Applicants' evidence are: the Examiner's First, Second, Third and Fourth Enablement Statements, the Poole 1988, 1995 and 1996 Enablement Statements, the Schuller Enablement Statement and Applicants' Affidavits of Mitzi, Dinger, Tsuei, Shaw, Duncombe, Newns and Bednorz in Brief Attachments AH to AR. In particular the Examiner has given no reason for why this claim is not enabled by Applicants' teaching in view of the underlined limitation of the claim which includes specific limitations on the scope of this claim.

The sentenced bridging page 1 and 2 of the specification states "Generally, superconductivity is considered to be a property of the metallic state of a material since all known superconductors are metallic under the conditions that

cause them to be superconducting. A few normally non-metallic materials, for example, become superconducting under very high pressure wherein the pressure converts them to metals before they exhibit superconducting behavior." Applicants discovered that ceramic materials are superconductors.